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**Glenn Brown**
Executive Director-
Public Policy



January 12, 1998

Ms. Magalie Roman Salas, Secretary
Federal Communications Commission
1919 M Street N.W., Room 222
Washington, D.C. 20554

RE: Ex Parte Presentation - Proxy Cost Models
CC Docket 96-45 and 97-160

Dear Ms. Salas:

On January 9, 1997 representatives of the Benchmark Cost Proxy Model (BCPM) team met with representatives of the FCC and Joint Board Staff to present our analysis of why the customer location and network design algorithms in BCPM3 are vastly superior to those in Hatfield 5.0, and to refute erroneous allegations made by the Hatfield sponsors in ex-parte letters filed on December 23 and 24, 1997. Representing the BCPM team were Peter Sywenki and Brian Staihr of Sprint, and the undersigned from U S WEST. Representing the Staff were Brian Clopton, Chuck Keller, Katherine King, Bob Laube, Jeff Prisbury, Richard Smith and Natalie Wales.

We made the following points in our presentation.

1. The precision which Hatfield attributes to their use of geocoded data to locate customers and design networks is belied by the inability to accurately locate customers in remote areas, and the way in which this data is used to design the local network.
    - Evidence suggests that only those customers in relatively densely populated areas can be successfully geocoded.
    - Geocoded data (including surrogate locations) is only used in the design of "cluster" boundaries. Once clusters are created (through a proprietary process known only to PNR and Associates) actual customer locations are discarded and the network is designed as though customers were uniformly distributed throughout the "cluster".

2. The BCPM3 location and network design process is based upon publicly available and verifiable data, the algorithms and code are fully documented, and the result is a more precise location of customers and more reliable network design.
    - The primary inputs are publicly available Census data at the CB level, and road data. To locate customers with the CB.
    - The algorithms and code which creates the "ultimate grids" and assigns customers to these grids have been provided on the record in this proceeding.
    - The network design algorithms are likewise fully documented, and assures that the network is built to locations where customers are, and is not built to locations where they are not.
    - Comparison of BCPM3 and Hatfield 5.0 results with actual RUS data suggests that the BCPM3 network is more accurate.

3. The BCPM sponsor's use of the figure of 74.4 million records in the Metromail database in our December 11, 1997 filing is based upon direct correspondence from Metromail (see attached) which we received in our attempt to replicate the analysis done by Hatfield. In their December 23, 1997 ex-parte letter the Hatfield sponsors state that they do not know where we secured our "inaccurate" data. The difficulty in determining the number of customers in the Metromail database, the proprietary nature of this data, and the "black-box" nature of the PNR clustering process all raise significant concerns about the ability of the Hatfield model to meet tenet Number 8 of the FCC's proxy model criteria:

> *The cost study or model and all underlying data, formulae computations, and software associated with the model must be available to all interested parties for review and comment. All underlying data should be verifiable, engineering assumptions reasonable, and outputs plausible.*

4. Additional points made in the Hatfield ex-parte letters are inaccurate.
   - The number of lines which can be served by a single DLC remote unit,
   - The ability of the BCPM3 to accurately include the number of business and residence lines in a grid.
   - The ability of BCPM3 to reflect actual distributions of second lines, and
   - The ability of BCPM3 to reflect a standard grid size throughout the United States.

In accordance with Commission Rule 1.1206(a)(2), four copies of the written presentation are being filed with your office. Due to the fact that the meeting concluded in the late afternoon, this submission is being filed on the next business day following the meeting. Acknowledgment and date of receipt are requested. A copy of this submission is provided for this purpose.

Please contact me if you have questions.

Sincerely,

Attachments

# BCPM Sponsors' Response to AT&T/MCI Ex Parte Presentations

I. The Hatfield Model 5.0 and the Myth of Geocoding

II. BCPM's Customer Location Algorithm: Evidence

III. Hatfield's Problem with Proprietary Data: Return to the Black Box

IV. Additional Responses: DLC Issues, HHs vs. HUs, Line Counts, Grid Sizes and More

## I. Hatfield Model 5.0 and the Myth of Geocoding

May 7th Universal Service Order
Page 153
*"At this point we conclude that we should not select one model over another because both models lack a compelling design algorithm that specifies where within a CBG customers are located."*

May 7th: Basic unit of analysis—CBG
December 11th: Basic Unit of analysis— Grid vs. Cluster

Fact: Hatfield Model 5.0 Contains NO Design Algorithm that specifies where within the basic unit of analysis customers are located.

## Customer Location in 2 Parts:

- Initially assigning customers to grid, cluster, CBG, or other basic unit of analysis.
- Subsequently placing customers at some location within that grid/cluster/CBG.

In HM5.0 preprocessing, PNR & Associates uses geocoded points and optimization routine to create clusters (part 1).

Once clusters are created and handed off to HAI, geocoded points are never again used.

Result: Customers are uniformly distributed within clusters (part 2).

*"For "regular" serving areas, the model computes the [p]lot [sic] size per customer location by dividing the effective area of the main cluster by the number of customer locations in the main cluster, as stated above."*

—Hatfield 5.0 Documentation, page 37

## How bad can this be? How big is a cluster? Examples:

GTE of Iowa, 266 of 834 clusters (32%) are 10 sq. miles in area or more.
GTE of Pennsylvania, 226 of 952 clusters (24%) are 10 sq. miles or more.
In both cases, some clusters are > 20 sq. miles.

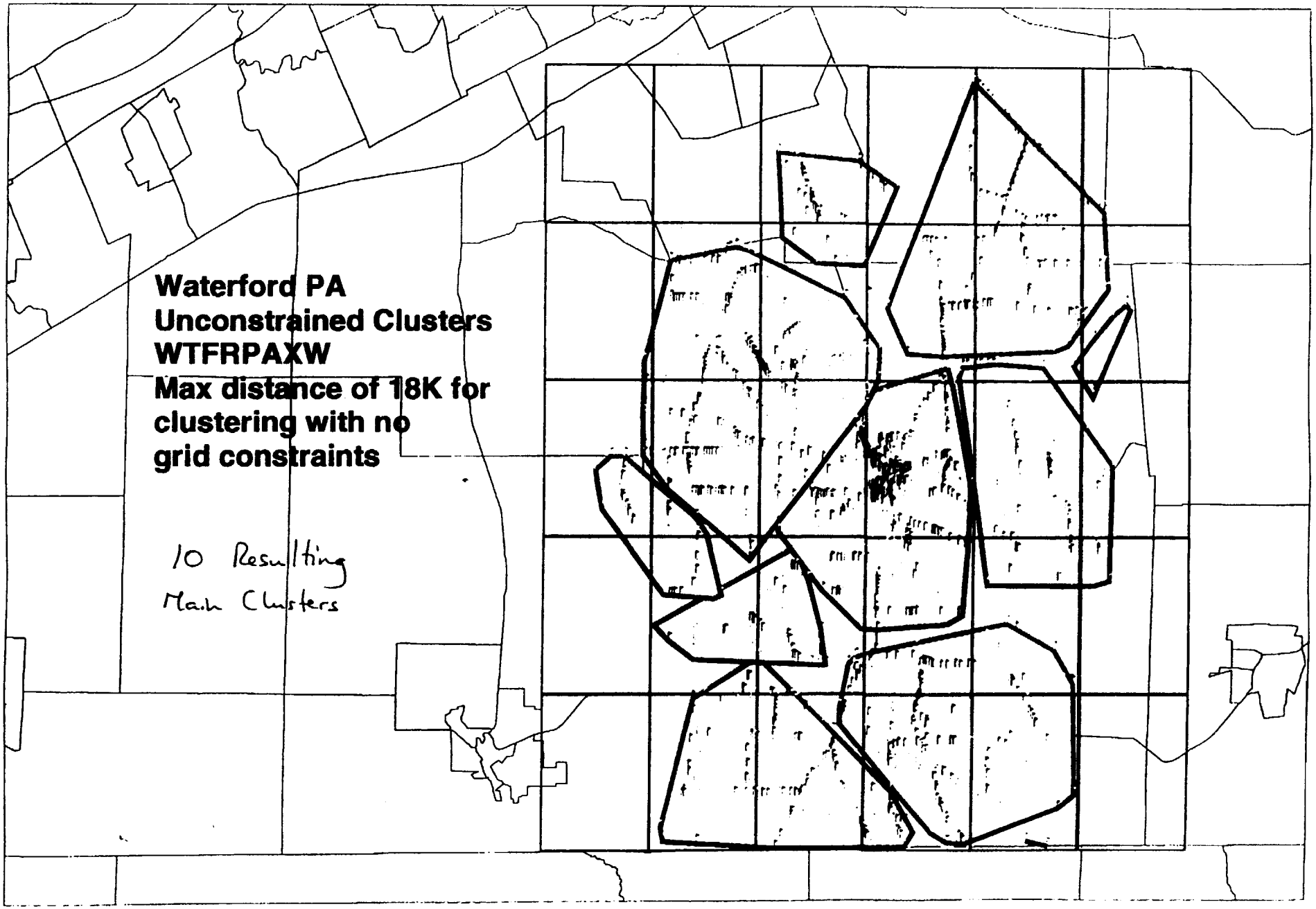
(No BCPM grid is larger than 9 sq. miles. This nine miles is split into quadrants, unpopulated area eliminated, distribution area centered over road centroids, etc.)

Result: In Waterford PA example provided by Hatfield Sponsors (fig. 15, ex parte presentation Dec. 23rd), *actual* cluster of customers displayed in center grid is ignored by HM5.0 when building outside plant. (This specific cluster is 13.3 square miles, contains approx. 1300 lines.)

Conclusion #1: Uniform distribution of customers across 20 sq. mile areas does not address concerns of May 7th Order, page 153.

Conclusion #2: Hatfield ex parte claim to superior customer location is *incorrect,* therefore *misleading* and *ironic* since the model completely abandons any geocoded points when building network.

Figure 15


Waterford PA
Unconstrained Clusters
WTFRPAXW
Max distance of 18K for
clustering with no
grid constraints
10 Resulting
Main Clusters

## More Geocoding Issues: The Metromail Controversy (Part 1)

Question: *Exactly how complete is the database that PNR uses to create Hatfield's clusters?*

Issues at Hand: Quantity and size of Hatfield Clusters depends on locations.

BCPM Sponsors: Metromail addresses cover less than 70% of customer locations.

Hatfield Sponsors: Database covers over 90% of locations. *"The HMS have been unable to determine where the BCPM Sponsor's might have secured their inaccurate data."*

Attached: Metromail document dated December 10th. Specifically note statement on page 3, *"Metromail does not capture non-published phone numbers and addresses."* Note sum of Total Households page 2 (74,439,258).

Addressed Below: Proprietary Issues regarding Metromail.

## More Geocoding Issues: Looking for Keys Under the Streetlight

Attached maps of Albany and Vernon, TX demonstrate the effectiveness of geocoding in urban areas and the lack of effectiveness elsewhere.

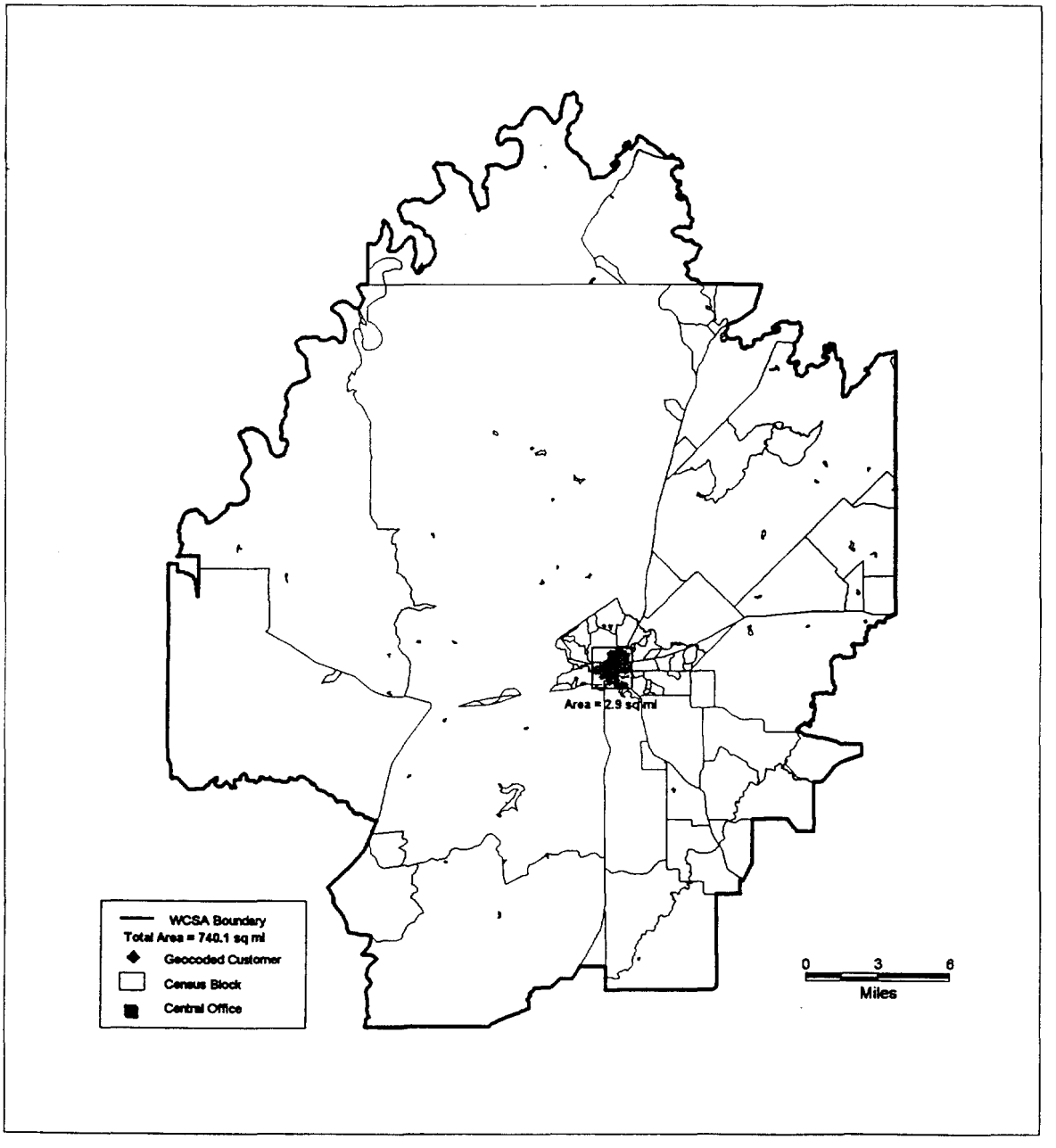
For Albany, only 16% of all customer points are geocoded. These points account for less than 0.4% of total wire center area.

For Vernon, 67% of all customer points are geocoded. These points account for less than 17% of total wire center area.

## II. BCPM Customer Location: Evidence and More Irony

*"BCPM3 Sponsors' assertion that their model's purported identification of customers as uniformly distributed along a CB's road network is...without evidentiary support."* Letter from Richard Clarke to FCC, Dec. 23, 1997.

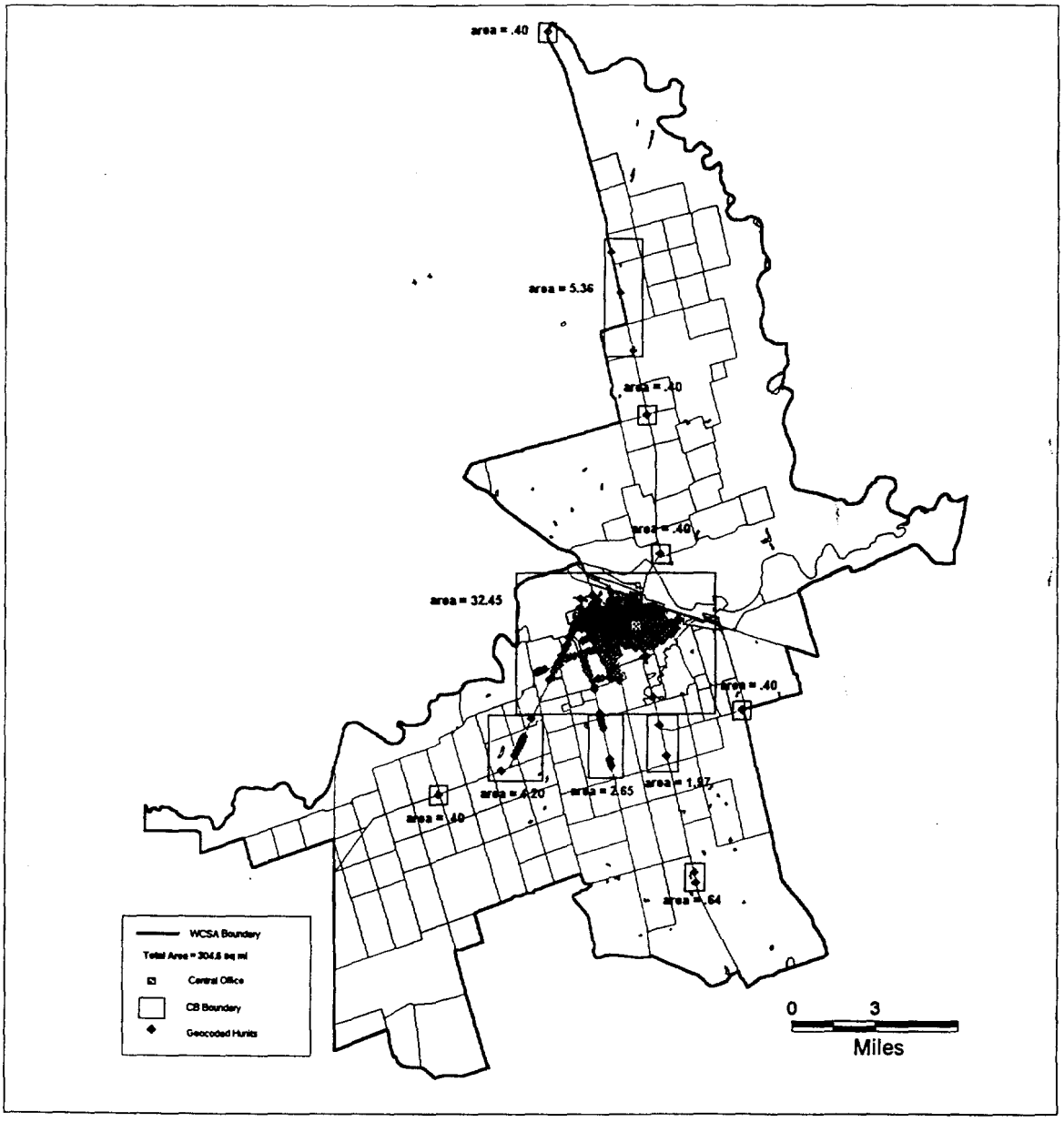
# Albany, Texas Wirecenter
## Area of Geocoded Customer Locations




* Please notice that all geocoded customer locations fall within an area of 2.9 square miles, or **less than 0.4%** of the total wirecenter area.

**Wirecenter TX 08614 4459**
**CLLI ALBYTXPC**

# Vernon, TX Wirecenter
## Area of Geocoded Customer Location



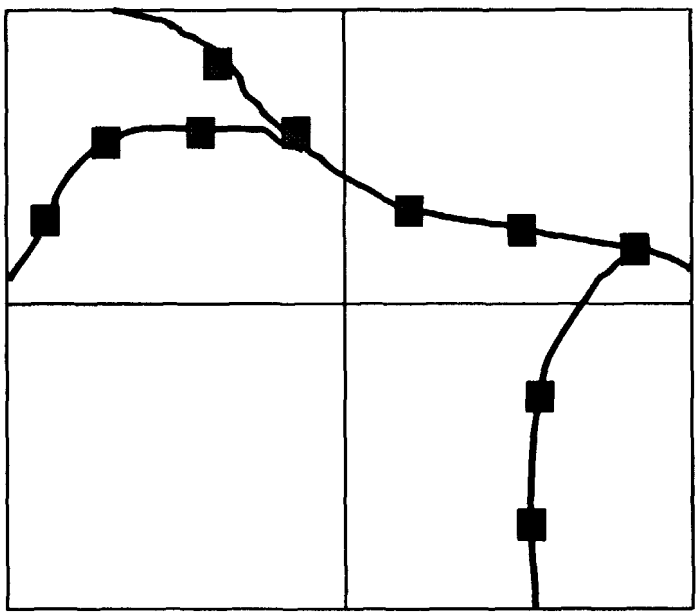

* Please notice that all geocoded customer locations fall within an area of 50.06 square miles, or **less than 17%** of the total wirecenter area.

**Wirecenter TX 08326 04567**
**CLLI VERNTXLI**

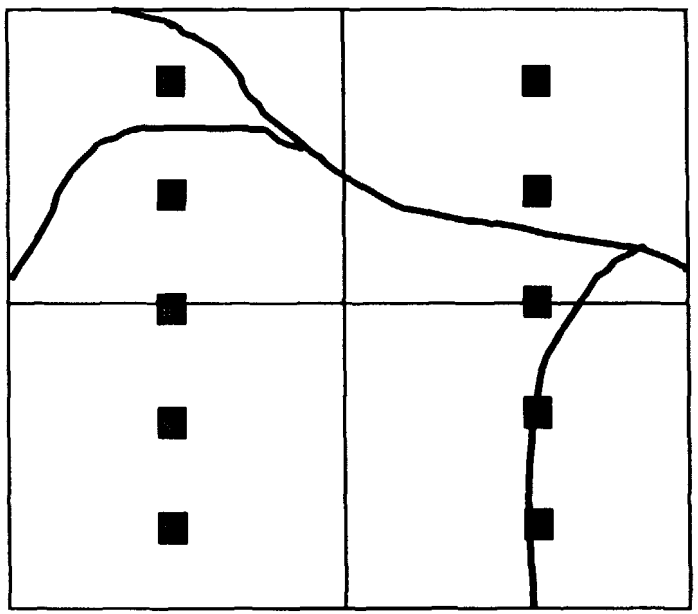
Question: Is the issue "uniform" distribution along roads or placing customer locations along roads?

Uniform Distribution: Placing customers uniformly along road miles can and will result in customers being clustered where clusters truly exist.

BCPM Grid



Hatfield Cluster



## Placement of Customer Locations Along Roads

Table Below Shows Statistical Correlation Between Census Block Road Miles and Census Block Housing Units by Density Zone (data: Kentucky).

| Density Range | Correlation |
|---|---|
| <5 | 0.78 |
| 5-20 | 0.86 |
| 20-100 | 0.93 |
| 100-200 | 0.93 |
| 200-650 | 0.92 |
| 650-850 | 0.91 |
| 850-2,550 | 0.92 |
| 2,550-5,000 | 0.90 |
| 5,000-10,000 | 0.81 |
| > 10,000 | 0.80 |

Irony: Returning to AT&T/MCI ex parte presentation Dec. 23rd. Figure 13, unconstrained clusters at max distance of 12K.

Clusters located in upper right clearly show customer locations aligned.

- Actual locations or surrogate locations?
- If actual, customers appear to be aligned along what clearly must be roads.
- If surrogate, customers are placed along CB's perimeter. Perimeter is either a river, a railroad track, or a road.

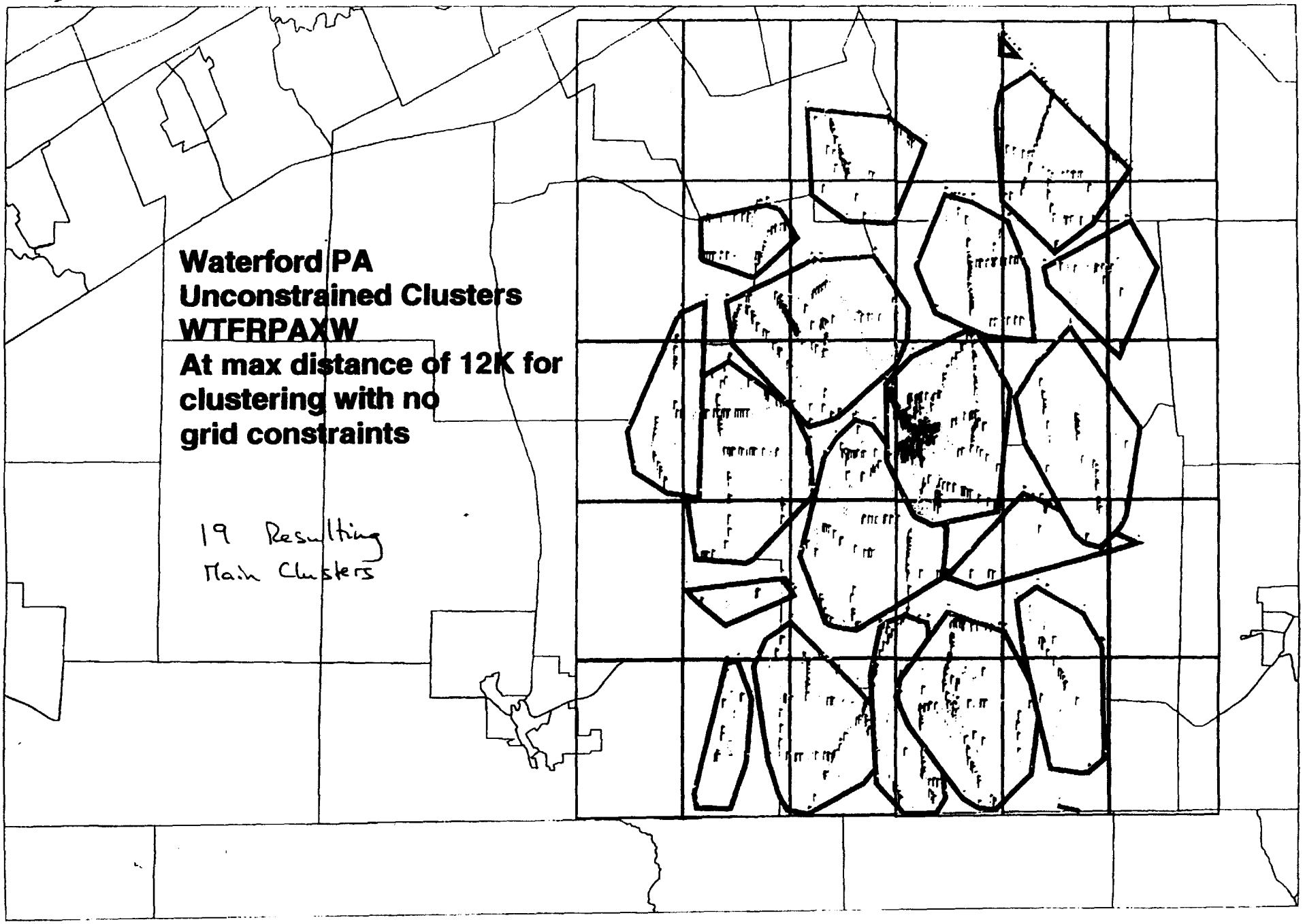
Irony is that, in either case, HM5.0 ignores this placement and spreads customers uniformly across cluster's entire area. Areas that are obviously empty are built to, and actual clusters are ignored.

## BCPM Customer Location: More Evidence

Attached: Actual route miles built by RUS, compared with route miles constructed by both HM5.0 and BCPM3.0 for various companies in Kentucky and Georgia.

Result: In the majority of cases (85%), and in the aggregate, BCPM mileage most closely approaches actual route miles.

Figure 13


Waterford PA
Unconstrained Clusters
WTFRPAXW
At max distance of 12K for
clustering with no
grid constraints
19 Resulting
Main Clusters

***Comparison of BCPM3.0 and HM5.0 to RUS Route Miles***
***State: Georgia***

| Company | 1996 RUS Route Miles | BCPM 3.0 Route Miles | HM 5.0 Route Miles |
|---|---|---|---|
| ALLTEL GEORGIA INC | 5,930 | 4,118 | 3,356 |
| ALMA TEL CO INC | 1,476 | 906 | 668 |
| BLUE RIDGE TEL CO | 1,141 | 846 | 656 |
| BRANTLEY TEL CO INC | 856 | 706 | 539 |
| BULLOCH COUNTY RURAL TEL COO | 1,485 | 1,043 | 938 |
| CAMDEN TEL TEL CO INC | 1,076 | 920 | 911 |
| CHICKAMAUGA TEL CORP | 304 | 250 | 225 |
| CITIZENS TEL CO INC | 921 | 748 | 524 |
| COASTAL UTILITIES INC | 2,451 | 968 | 969 |
| DARIEN TEL CO INC | 495 | 484 | 360 |
| NELSON-BALL GROUND TEL CO | 509 | 470 | 387 |
| PEMBROKE TEL CO INC | 407 | 620 | 354 |
| PINELAND TEL COOP INC | 2,454 | 1,906 | 1,514 |
| PLANT TEL CO | 1,772 | 1,492 | 1,051 |
| PLANTERS RURAL TEL COOP INC | 1,619 | 1,211 | 927 |
| PROGRESSIVE RURAL TEL COOP IN | 2,029 | 823 | 635 |
| PUBLIC SERVICE TEL CO | 1,867 | 1,569 | 1,188 |
| RINGGOLD TEL CO | 577 | 382 | 354 |
| STANDARD TEL CO | 6,635 | 3,829 | 3,331 |
| WAVERLY HALL TEL CO INC | 203 | 143 | 108 |
| WILKES TEL ELEC CO INC | 2,014 | 1,431 | 1,115 |
| WILKINSON COUNTY TEL CO INC | 361 | 511 | 373 |
| **Summary** | **36,582** | **25,375** | **20,483** |

***Comparison of BCPM3.0 and HM5.0 to RUS Route Miles***
***State: Kentucky***

| Company | ~~1998~~ RUS Route Miles | ~~BCPM~~ 3.0 Route Miles | HM 5.0 Route Miles |
|---|---|---|---|
| ALLTEL KENTUCKY, INC. | 1,015 | 641 | 668 |
| BALLARD RURAL TEL. COOP. CORP., INC. | 1,089 | 545 | 517 |
| BRANDENBURG TEL. CO., INC. | 1,752 | 1,315 | 1,133 |
| DUO COUNTY TEL. COOP., INC. | 1,314 | 1,152 | 1,019 |
| FOOTHILLS RURAL TEL. COOP. CORP., INC. | 1,833 | 1,758 | 1,426 |
| HAROLD TEL. CO., INC. | 331 | 416 | 361 |
| LESLIE COUNTY TEL. CO., INC. | 975 | 1,309 | 1,024 |
| LEWISPORT TEL. CO., INC. | 128 | 97 | 50 |
| LOGAN TEL. COOP., INC. | 1,075 | 946 | 656 |
| MOUNTAIN RURAL TEL. COOP. CORP., INC. | 2,458 | 2,202 | 1,589 |
| PEOPLES RURAL TEL. COOP. CORP. | 1,148 | 1,225 | 826 |
| SALEM TEL. CO. | 384 | 304 | 258 |
| SOUTH CENTRAL RURAL TEL. COOP. CORP., I | 4,723 | 3,184 | 2,597 |
| THACKER/GRIGSBY TEL. CO., INC. | 636 | 809 | 677 |
| WEST KY. RURAL TEL. COOP. CORP., INC. | 2,735 | 1,763 | 1,557 |
| **Summary** | **21,596** | **17,666** | **14,358** |

Additional Evidence:

Early Indications for Albany and Vernon:

In the most rural areas (density less than 5) the correlation between BCPM location and actual SBC location is above 70%

The correlation between Hatfield 5.0 location and actual SBC location for the same areas is under 40%.

## III. Proprietary Data: Hatfield's Return to the Black Box

May 7th Order...
*"The cost study or model and all underlying data, formulae, computations, and software associated with the model must be available to all interested parties for review and comment".*

Issue: Data and algorithms associated with Hatfield 5.0 are not only proprietary, but are not available to all interested parties willing to pay.

Attachment: Letter from Dr. Steve Parsons, Indetec International, to Bill Newman, PNR & Associates, regarding the proprietary nature of...

- actual geocoded locations
- counts of said locations
- algorithms

Note: *"PNR & Associates currently considers the actual geocoded locations used in producing the HM5.0 clusters as proprietary to your data vendors and this data cannot be sold or provided to any customer."*

## Proprietary Data: In Total

BCPM Sponsors contacted Metromail, Centrus, PNR & Associates.
Data was purchased from Metromail and Centrus
This was used to replicate the development of Hatfield data, maps shown for Vernon and Albany TX.

BCPM Sponsors were informed clustering algorithms and CB perimeter allocation algorithms are intellectual property of PNR and have not been sold to Hatfield Sponsors.

January 8, 1998

Mr. William Newman
PNR and Associates
101 Greenwood Avenue
Suite 502
Jenkintown, PA 19046

Bill,

Thanks for spending the time with me on the telephone in late December. Since I have not heard back from you recently, I wanted to confirm a couple of things to make sure INDETEC can proceed in a timely manner with our model evaluation. First, it is my understanding that PNR and Associates currently considers the actual geocoded locations used in producing the HM 5.0 clusters as proprietary to your data vendors and this data cannot be sold or provided to any customer. Second, the counts of actual geocoded customer locations at relatively small geographic areas, such as census blocks or census block groups, used in producing the HM 5.0 clusters, are also considered proprietary by PNR and Associates and will not be sold or provided to any customer.

Third, it is my understanding that PNR is still evaluating whether the counts of actual geocoded customer locations used in producing the HM 5.0 clusters should be considered proprietary for larger geographic areas, such as counties. If such information is not considered proprietary, PNR has not yet established a price for the data.

Please call me as soon as possible if I have not provided a reasonable characterization of the availability of the data.

Sincerely,

Steve G. Parsons, Ph.D.
GM Regulatory & Litigation Support
INDETEC International Inc.
6838 Pershing Ave.
University City MO 63130
voice (314) 862-6883 fax 725-7101
Email: sparsons@indetec.com

cc: Curt Huttsell
Jim Stegeman

# AFFIDAVIT

STATE OF MISSOURI

COUNTY OF ST. LOUIS

BEFORE, ME, the undersigned authority, duly commissioned and qualified in and for the State and County aforesaid, personally came and appeared Steve G. Parsons, of INDETEC International, who, being by me first duly sworn, deposed and said that:

He has personal knowledge of the attached letter to William Newman of PNR and Associates. Dr. Parsons talked with Mr. Newman on more than one occasion regarding the availability of data. Dr. Parsons sent the letter to Mr. Newman by fax on January 8, 1998. Dr. Parsons believes that the letter reasonably represents the characterization by PNR and associates and he has no information to indicate that this is not a reasonable characterization.

Steve G. Parsons

STEVE G. PARSONS

SWORN TO AND
SUBSCRIBED BEFORE ME
this the 9 th day
of January 1998.

Diane Yancer

NOTARY PUBLIC

My Commission expires: 2/21/00

DIANE YANCZER
Notary Public – Notary Seal
STATE OF MISSOURI
St. Louis City
My Commission Expires: Feb. 21, 2000

Hatfield Process:
Customer locations are either geocoded (proprietary) or assigned to CB perimeters (algorithm is proprietary) and then are converted to clusters (algorithm is proprietary) which form the basic units of analysis.

Validation is impossible for any of the following:

- customer counts within clusters
- areas of clusters
- % actual vs. surrogate locations within clusters
- shape of clusters

## IV. Additional Responses to Various Issues

### A. Digital Loop Carrier Location Issue:

Hatfield Sponsors: *"BCPM's placement of DLC at road centroid is flawed. At this point there may be no roads and no customers." (paraphrased)*

BCPM Sponsors: Hatfield's placement of DLC at geographic centroid of cluster-converted-into-rectangle is *no more likely* to be located near roads or customers.

Bottom Line: To achieve maximum efficiency, DLC placement should occur at the center of population dispersion. BCPM uses road mileage dispersion as a proxy for population dispersion. Hatfield does not consider population dispersion.

B. Digital Loop Carrier Capacity Issue

Hatfield Sponsors: *BCPM has misstated (underestimated) maximum DLC capacity. As a result, electronics are overstated. (paraphrased)*

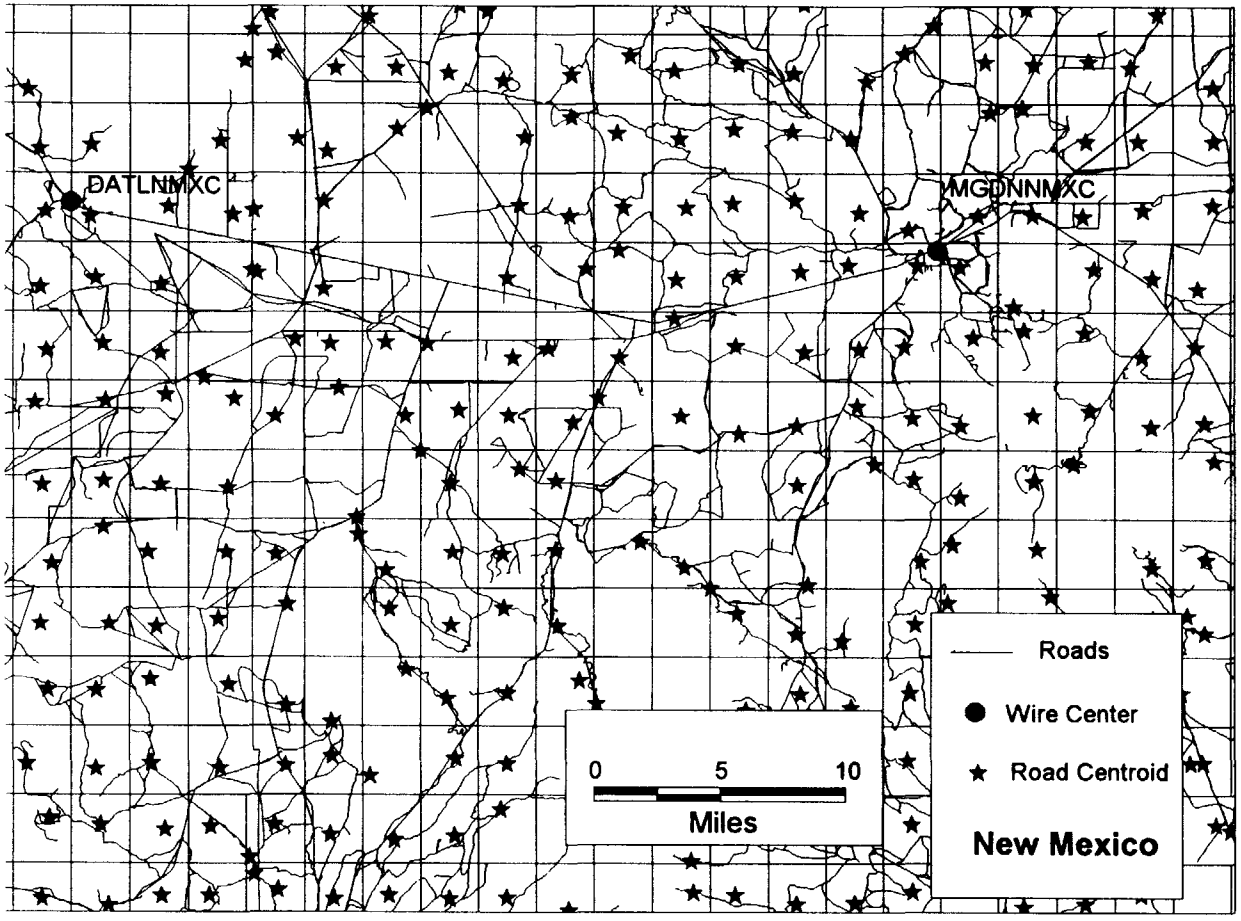
BCPM Sponsors: Issue is not whether DLCs with Hatfield's stated capacity exist, but whether such a DLC would be deployed remotely. Constraints on cabinet size dictate that 2,016 lines is appropriate for central office terminals, but self-contained remotes are constrained to 1,344 lines (DSC, Litespan LSC 2030 Remote Terminal Outdoor Cabinet Description)

C. Ability to Accurately Include Number of Res Lines in a Census Block

Hatfield Sponsors: "*BCPM number are flawed, based on statewide factors. Hatfield numbers are superior, being the result of PNR's econometric modeling. (paraphrased)*".

BCPM Sponsors: Two specific points...

1) BCPM defaults to statewide factors only when actual wire center line counts are not available. It is our expectation that the Administrator will, with the FCC's assistance, obtain actual line counts to be input into the model, in accordance with paragraph 251 of the May 7th Order.
2) It is highly questionable whether Hatfield's use of logistic regressions for second lines has any statistical validity at the CB level. The HM5.0 Sponsors have failed to demonstrate this validity even at the company level, and again, the models themselves are the intellectual property of PNR and not available.


DATLNMXC
MGDNNMXC
Roads
Wire Center
Road Centroid
New Mexico
0
5
10
Miles